

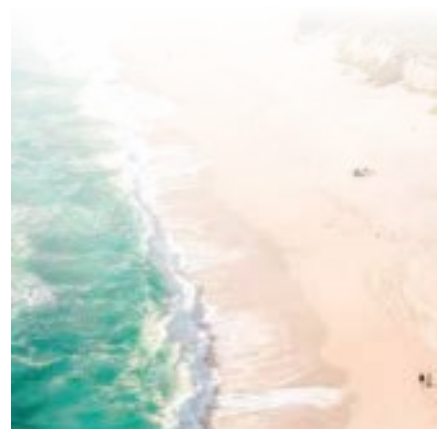
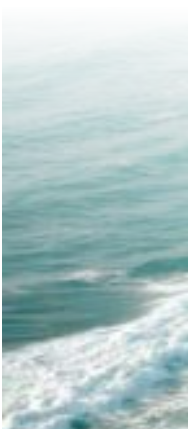


OCEAN PROTECTION COUNCIL

EXECUTIVE DIRECTOR'S REPORT

November 13, 2019 - February 26, 2020

Providing an update on outcomes and accomplishments since the previous OPC Meeting.



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GOVERNOR NEWSOM'S PROPOSED CLIMATE BUDGET

On January 10, 2020, Governor Newsom released his \$222.2 billion State Budget proposal for 2020-21. A component of this budget includes a proposed \$4.75 billion Climate Resilience Bond for the November 2020 ballot that is intended to support investments over the next five years to reduce climate risk across California through long-term investment in natural and built infrastructure. \$500 million of these bond funds would be directed to the Ocean Protection Council to support projects (in collaboration with partner state agencies) that build resilience for coastal ecosystems and human communities in the face of sea-level rise and changing ocean conditions. This \$500 million would be directed to specific priorities as follows: \$320 million for coastal wetland restoration; \$65 million for nature-based solutions to build resilience; \$65 for research and implementation efforts to respond to changing ocean conditions including protecting kelp forest and seagrass habitat, wetland habitat carbon sequestration, climate-ready fisheries, marine protected areas, ocean acidification and hypoxia, plastic pollution, harmful algal blooms,

pathogens and marine invasive species; and \$50 million for demonstrations projects to protect critical infrastructure.

UPDATES BY STRATEGIC PLAN GOAL

Safeguard Coastal and Marine Ecosystems and Communities in the Face of Climate Change • Advance Equity Across Ocean and Coastal Policies and Actions • Enhance Coastal and Marine Biodiversity • Support Ocean Health through a Sustainable Blue Economy

SAFEGUARD COASTAL AND MARINE ECOSYSTEMS AND COMMUNITIES IN THE FACE OF CLIMATE CHANGE

United Nations Framework Convention on Climate Change: Conference of the Parties 25

The 2019 United Nations Climate Change Conference was held in Madrid, Spain from December 2 - 13. In recognition of the linkages between the ocean and climate change, this summit was the first “Blue COP.” This was significant given that the international climate effort has long overlooked ocean issues. Secretary Crowfoot, Secretary Blumenfeld, and the Ocean Protection Council’s (OPC) Whitney Berry, spoke on several ocean-climate leadership panels, detailing California’s commitment to ocean-climate stewardship and highlighting the impacts of climate change to our ocean, ecosystems, communities, and economy. Secretary Crowfoot announced the launch of the Pacific Rim Ocean Climate Action Partnership (PROCAP) alongside the Fijian Attorney General, followed by the first wave of signatories, including Panama, Peru, and Costa Rica. PROCAP is a national-subnational coalition dedicated to driving ambitious reductions in greenhouse gas emissions, maximizing sustainable ocean-related mitigation measures, and building the climate resilience of the ocean and the communities and economies on the frontlines of ocean and climate change. Additionally, OPC contributed to a number of ocean-climate communications documents, videos, and statements that help to set standards for ambitious climate action and build political will at both subnational and national levels.

Ocean Acidification Progress Report

California has taken proactive steps during the last decade to increase our understanding of ocean acidification, invest in decision-relevant science, and develop the State of California Ocean Acidification Action Plan (OA Action Plan). OPC and Ocean Science Trust staff have authored progress report to the Ocean Protection Council (*Exhibit A, below*), updating the Council on California state policy, management, and ongoing science related to changing ocean chemistry. This report outlines current progress to address ocean acidification in California, identify how existing OPC investments advance the goals of the OA Action Plan and OPC strategic priorities, and share the State’s near-term next steps to slow rates of acidification and prepare communities.

Sea Level Rise Coordination

OPC staff continue to coordinate sea-level rise (SLR) efforts amongst state agencies. On January 23, 2020, Secretary Crowfoot convened executive leadership from 10 state agencies to discuss a set of foundational SLR Principles to improve California resilience, now and into the coming decades. The group is finalizing the specific language around the Principles but found agreement in the main pillars: Best Available Science, Partnership, Alignment, Communications, Local Support, and Coastal Resilient Projects. These Principles will guide unified, effective action toward SLR resilience for California’s coastal communities, ecosystems, and economies. To move the State forward on SLR Communications, OPC will hold an in-person workshop on February 24,

2020 with many of the same agencies to discuss updates on an OPC grant to develop messaging that underscores the urgency of taking action to plan and adapt for SLR impacts.

ADVANCE EQUITY ACROSS OCEAN AND COASTAL POLICIES AND ACTIONS

Engagement with Tribes

OPC staff are collaborating with a small group of California Tribes to develop a Tribal Monitoring Program that will focus on marine and coastal scientific and ecological monitoring in collaboration with the state. The early focus will be on marine protected area monitoring, with the scope and number of participating Tribes broadening over time. Participating Tribes will develop a plan for a multi-year pilot project that would likely be brought to the Council for funding approval at its June 19, 2020 meeting. The intent is to work towards Tribal capacity-building similar to the Coastal Guardian Watchmen in British Columbia and the Land and Sea Ranger Program in Australia. Other partners in this effort include the California Department of Fish and Wildlife (CDFW), Resources Legacy Fund and the California Indian Environmental Alliance. All partners will meet in Santa Rosa on March 2, 2020 to initiate discussions and advance program development.

ENHANCE COASTAL AND MARINE BIODIVERSITY

Marine Protected Areas (MPAs)

Two OPC Science Advisory Team (OPC SAT) Working Groups related to MPAs have begun work. The Decadal Evaluation Working Group will provide scientific guidance to the state in support of 10-year MPA management evaluations, and the MPAs and Climate Resilience Working Group will explore the role that California's MPA network may play in providing resilience to climate stressors such as marine heat waves, ocean acidification, and hypoxia. Final Working Group products, which are expected by the end of 2020, will provide resource managers with an improved understanding of MPA performance in the context of changing ocean conditions, helping to ensure a successful first evaluation of the MPA network in 2022 and contributing to broader state priorities such as sustainable fisheries and climate resilience. Funding for the two Working Groups was approved by the Ocean Protection Council at the May 2019 meeting and are facilitated in partnership with California Ocean Science Trust (OST) and CDFW.

At the end of 2019, Secretary Crowfoot and the MPA Statewide Leadership Team welcomed two new Regional Tribal Representatives to the Leadership Team. The South Coast Primary Representative is Ms. Teresa Romero, Environmental Director for the Santa Ynez Band of Chumash. The North Coast Alternate Representative is Ms. Lorelle Ross, Tribal Vice Chair of the Federated Indians of Graton Rancheria. Since time immemorial, California's Native American Tribes have stewarded coastal and marine resources, and the Leadership Team is honored that Ms. Romero and Ms. Ross have volunteered to bring their knowledge and experience to bear on MPA management in California. Ms. Megan Van Pelt and Mr. Reno Franklin continue to serve as the North Coast Primary and North Central Coast Primary Representatives respectively. Applications for the remaining open Tribal Representative seats are currently under review.

The MPA Outreach and Education Small Grants Program, funded by OPC through the Once-Through Cooling Interim Mitigation Program and administered by Coastal Quest, is a competitive grant program providing support for projects focused on outreach and education to improve compliance with MPA regulations statewide. A minimum total of \$750,000 will be distributed under the MPA Outreach and Education Small Grants Program's request for proposals, which closed on January 27, 2020. Applicants submitted small grant proposals for up to \$100,000. Proposals are

currently under review by the Grant Review Committee, which consists of a diverse group of MPA education experts. Selected projects are anticipated to begin by June 2020.

OPC and CDFW continue to make progress in their effort to add California's MPA network to the International Union for Conservation of Nature (IUCN) Green List of Protected and Conserved Areas. Through a public call facilitated by OPC and CDFW, IUCN has convened an Expert Assessment Group which will evaluate California's MPA network against Green List criteria. This diverse group, which includes representatives from a variety of ocean stakeholder communities, met for the third time in November 2019 to begin its evaluation work. OPC staff has also been invited to join the Green List Operations Team, a collaborative body that will facilitate critical knowledge exchange between California and other members of the international Green List community.

In January 2020, OPC staff had the honor of meeting with the Prime Minister of the Cook Islands to discuss the creation and ongoing management of California's MPA network and lessons learned that can help inform the management of the Cook Islands' 2 million square kilometer MPA, Marae Moana. Ongoing partnership with the Cook Islands is anticipated in 2020.

Kelp Forest Ecosystem Resilience:

Restoring and protecting kelp ecosystems remains a top priority for OPC. See [Item 5](#) for a staff recommendation regarding removal of purple urchins by commercial fishermen, as well as associated ecological monitoring, in support of kelp forest recovery on California's North Coast. In addition, California Sea Grant, OPC and CDFW are currently partnering to develop a solutions-oriented call for proposals to protect kelp forest ecosystems, which is anticipated to be released soon.

Work on two kelp research projects approved in 2019 through the Executive Director's delegated authority has begun. Reef Check California has initiated site selection and preliminary experimental design for a study that will determine the minimum urchin density threshold for urchin barrens to be converted back to bull kelp forests on California's north coast. The Nature Conservancy has also started work to facilitate aerial surveys of kelp canopy cover (both surface and submerged) from Monterey to the California/Oregon border. In 2019, due to the Kincadee fire and some early and heavy winter storms, the field conditions were limited to a single day of flying which allowed for a kelp aerial survey of the region between San Francisco and Bodega Bay. The project will be extended through 2020 to support a kelp aerial survey for the full region between Monterey and the California/Oregon border in 2020.

Protecting Whales and Sea Turtles & Ensuring Thriving Fisheries

See [Item 6](#) for a staff recommendation regarding implementation of the state's drift gillnet transition program, and two projects to support California's entanglement response network and disentanglement trainings, in alignment with OPC's [investment strategy](#) to reduce the risk of entanglement in California fishing gear, approved at OPC's November 13, 2019 meeting.

Red Abalone Management Strategies Integration

OPC partnered with Tribal representatives, CDFW, the California Fish and Game Commission (FGC), The Nature Conservancy, the North Coast recreational red abalone fishing community, and other partners to integrate proposed recreational red abalone management strategies to inform the Red Abalone Fishery Management Plan for the North Coast recreational fishery. The Administrative Team, consisting of a Tribal representative, OPC, CDFW, FGC, TNC, and fishing industry

representatives, developed a report to respond to the December 2018 Fish and Game Commission motion and to summarize the management strategy integration process. The report is intended to capture and summarize Project Team discussions and guidance from May 2019-December 2019, including guidance related to the Management Strategy Evaluation (MSE) results, the Exceptional Circumstances Strawman proposal, *De Minimis* Strawman proposal, etc. This report was discussed at the February 21, 2019 FGC meeting. For more details on the red abalone management strategies integration process, see the OPC project webpage [here](#).

Microplastics Strategy

OPC staff is starting development of several important pieces of the Microplastics Strategy, as required by Senate Bill (SB) 1263. OPC staff is working with OST to facilitate an OPC SAT Working Group on Microplastics. This Working Group is charged with developing a risk assessment framework for microplastics and identifying critical data gaps that prevent the completion of a quantitative risk assessment. The Working Group is expected to begin work in March 2020, with the risk assessment framework and identified data gaps provided in October 2020. OPC staff will use the risk assessment framework and the identified data gaps to develop a prioritized research plan, as required by SB 1263.

Although the majority of OPC's microplastic investments are anticipated to occur after the Working Group makes its recommendations in October, OPC staff intend to bring two research projects to the June 2020 Council meeting. The projects will provide critical and timely data necessary to inform OPC's initial policy recommendations to the Legislature in 2021. The first project would examine the effectiveness of different levels of wastewater treatment at removing microplastics from wastewater effluent. The second project would further examine the sources and sub-pathways of microplastics and microparticles to stormwater and would be a first step toward understanding the most effective policy and microplastic reduction strategies for stormwater. A recent study in San Francisco Bay found that stormwater transports 300 times more microplastics to the Bay than wastewater, making it a new area of policy and regulatory focus.

California Ocean Litter Prevention Strategy Implementation

OPC is partnering with the NOAA Marine Debris Program (NOAA) to facilitate implementation of the [California Ocean Litter Prevention Strategy](#) (Strategy). Most recently, OPC and NOAA staffs hosted a webinar on December 9th, 2019 to provide in-depth updates on three Strategy-related projects in California, and general updates on ocean litter-related work within the state.

As part of the Strategy implementation process, OPC and NOAA have committed to hosting check-in webinars every six months, and in-person workshops every two years. The first implementation workshop has been scheduled for June 24-25, 2020 at the Environmental Learning Center at Hyperion, in Playa Del Rey. The workshop will provide participants with opportunities to share information, troubleshoot, and plan to build on successful actions. The first round of invitations was sent out to participants in February. Later this year, OPC staff anticipate soliciting proposals for projects that will implement the priorities and actions outlined in the Strategy.

California Water Quality Monitoring Council

OPC is expanding its involvement with the California Water Quality Monitoring Council (CWQMC), a state agency that is charged with integrating and coordinating water quality and related ecosystem monitoring, assessment, and reporting throughout state agencies. OPC staff participated in the CWQMC's strategic planning meeting in January and is actively working increased engagement in the CWQMC's work.

SUPPORT OCEAN HEALTH THROUGH A SUSTAINABLE BLUE ECONOMY

Dungeness Crab Task Force

The Dungeness Crab Task Force (DCTF) – separate and distinct from the California Dungeness Crab Fishing Gear Working Group – 2020 commercial fishing elections are currently underway. DCTF commercial fishing elections occur every three years in each port, on a staggered basis across ports, and are conducted by OPC in partnership with the California Department of Fish and Wildlife (CDFW). Nomination Forms are due by March 6, 2020. Any Dungeness crab permit holder can nominate individuals for the DCTF. Ballots in 2020 will be compiled from the list of nominees for the following ports: Half Moon Bay, Bodega Bay, Eureka, and non-resident Dungeness crab permit holders. The DCTF was created in 2008 to review and evaluate Dungeness crab fishery management measures and provide recommendations to the Joint Committee on Fisheries and Aquaculture, CDFW, and FGC and includes seventeen commercial Dungeness crab fishermen across port complexes, seven members representing sport fishing, crab processing, commercial passenger fishing vessel, nongovernmental organization interests and non-voting members from CDFW and California Sea Grant. See the [DCTF website](#) for more details.

Offshore Wind Energy

Over the last four months, OPC staff have been participating in a Central Coast Offshore Wind Working Group convened by district staff of Congressman Salud Carbajal. The primary goal of the working group is to develop options that accommodate both offshore wind development and Department of Defense testing, training and operations on the Central Coast. Other working group participants include staff and officials from the California Energy Commission (CEC), Bureau of Ocean Energy Management (BOEM), Department of Defense, the National Oceanic and Atmospheric Administration, and State Senator Monning's District Office.

On February 7, 2020 the working group released for public comment an initial set of options. A map and discussion of these options can be found on the CEC's website at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?doctnumber=17-MISC-01>. The CEC will be accepting comments through May 15, 2020. In addition, the working group will be conducting public outreach along Central Coast during March and April. This includes, but is not limited to, the Big Sur Multi-Agency Advisory Committee meeting on March 20, Monterey Bay National Marine Sanctuary Advisory Council meeting on April 17 and a public workshop in Morro Bay in either March or April 2020.

On March 9, there will be a BOEM-California Intergovernmental Renewable Energy Task Force webinar. The purpose of the webinar will be to receive updates from BOEM, CEC, and OPC on the current status of offshore wind planning and research activities in California. An agenda and additional meeting information will be posted at <https://www.boem.gov/renewable-energy/state-activities/california-activities>.

PROJECTS APPROVED BY EXECUTIVE DIRECTOR’S DELEGATED AUTHORITY

This section provides a summary of projects approved between November 2019 and February 2020 through the OPC Executive Director’s delegated authority.

Grantee	Project	Amount	Description
Strategic Earth Consulting	California Dungeness Crab Fishing Gear Working Group	\$168,928	This project supports the continued operation of the California Dungeness Crab Fishing Working Group in 2020 to carry out its charge to develop strategies to reduce the risk of entanglement in Dungeness crab fishing gear and to support both thriving whale and sea turtle populations along the West Coast, as well as a thriving and profitable Dungeness crab fishery. This project builds upon OPC’s previous support of the Working Group and aligns with OPC’s investment strategy to reduce the risk of entanglement in fishing gear that was approved by the Council at its November 13, 2019 meeting.

PERSONNEL NOTES

Matthew (Matt) Warham, 2020 CA State Sea Grant Fellow – *Marine Protected Areas*, joined OPC in January 2020 as a CA State Sea Grant Fellow. Matt supports OPC’s MPA program on projects ranging from research and monitoring to outreach and education. Matt earned a Master’s Degree in Environmental Science & Management from the Bren School at UC Santa Barbara and Bachelor’s Degrees in Environmental Studies and Global Studies from UC Santa Barbara. His master’s group thesis work evaluated the potential of commercial aquaculture in Baja California, Mexico as a conservation strategy for an endangered fish species. Prior to his work at OPC, Matt spent time working in both the Caribbean and the South Pacific, as well as his beloved southern California.



Michaela Miller, 2020 CA Sea Grant Policy Fellow – *Climate*, joined OPC in February 2020. Michaela supports OPC’s climate change program focusing on sea level rise, ocean acidification, and other climate change related impacts. Michaela earned a B.S. in Environmental Science from CSU Channel Islands and a M.S. in Applied Marine and Watershed Science from CSU Monterey Bay. Her graduate research focused on



assessing major trends in marine debris and microplastic accumulation on the Northern Channel Islands. Prior to joining OPC, Michaela managed a marine debris monitoring and removal project on Santa Rosa and Santa Cruz Islands jointly run by CSU Channel Islands and Channel Islands National Park.

FUNDING

All funding opportunities are designed to address the priority issue areas identified in OPC's Strategic Plan.

Water Quality, Supply and Infrastructure Improvement Act of 2014 (Proposition 1)

At the November 13, 2019 OPC meeting, three Proposition 1 grants were approved as part of Round 3. At the February 2020 meeting, one last project from Round 3 is being recommended by staff for Council consideration and possible approval (See [Item 8](#)). Round 4 of OPC's Proposition 1 grant cycles will begin in March 2020. If the Council approves funding the Prop 1 project under Item 8, OPC will have approximately \$7.5 million remaining for Round 4.

California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access for All Act of 2018 (Proposition 68)

In 2018, OPC received a \$10 million appropriation from Chapter 9 of Proposition 68 and a \$10 million appropriation from Chapter 10 of Proposition 68. OPC staff will begin advancing this funding through both competitive and discretionary processes in the next month.

General Fund to Address Whale and Sea Turtle Entanglement in Fishing Gear

The Budget Act of 2018 included a \$7.5 million General Fund appropriation to OPC to address whale and sea turtle entanglement. During OPC's November 13, 2019 meeting, the Council approved an investment strategy to reduce the risk of entanglement in fishing gear. [Item 6](#) includes consideration and potential approval of implementation of the state's drift gillnet transition program, and two projects to support California's entanglement response network and disentanglement trainings. OPC staff anticipate releasing a competitive request for proposals in 2020 for projects that improve scientific information critical to informing ongoing risk evaluation and management responses. Discretionary funding will also be available to support the other components of the strategy related to collaborative partnerships, gear innovation, and response and outreach.

Environmental License Plate Funds

The Budget Act of 2018 included a \$15 million appropriation of Environmental License Plate Funds to OPC to support projects that advance coastal resilience in the face of climate change. OPC has approximately \$12.5 million remaining and will advance competitive and discretionary processes in 2020 to support cross-cutting climate change resiliency projects.

MEDIA HIGHLIGHTS

“What’s tangling up the humpback whales? A food chain snarled by climate change.”

<https://www.latimes.com/california/story/2020-01-27/crab-fishing-whale-entanglement-study>

“Ocean Heat Waves Linked to Rise in Whale Entanglement”

<https://www.scientificamerican.com/article/ocean-heat-waves-linked-to-rise-in-whale-entanglements/>

“Car tyres a likely source of microplastics in coastal waters.”

<https://www.thestar.com.my/lifestyle/living/2020/02/20/car-tyres-a-likely-source-of-microplastics-in-coastal-waters>

“Dungeness crab larvae already showing effects of coastal acidification.”

<https://research.noaa.gov/article/ArtMID/587/ArticleID/2581/Dungeness-crab-showing-impact-of-coastal-acidification>

“Funding for bull kelp restoration studies expected in 2020.”

<https://www.advocate-news.com/2020/01/02/funding-for-bull-kelp-restoration-studies-expected-in-2020/>

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A DECADE OF ACTION ON OCEAN ACIDIFICATION IN CALIFORNIA

A progress report to the Ocean Protection Council on state policy, management, and science to address changing ocean chemistry



IMAGE: MARK DEWEY



IMAGE: JERRY KIRKHART

CALIFORNIA IS ON A PATH TO ACHIEVING A 10-YEAR VISION

Waters off the coast of California are acidifying at twice the rate of the global average, driven by uptake of carbon dioxide released by the burning of fossil fuels and changing land uses. Devastating failure of oyster hatcheries in the Pacific Northwest signaled the first ocean acidification (OA) warning sign in the region. Corrosive waters are putting at risk our vibrant coastal and ocean ecosystems, and have recently been linked to dissolving shells in Dungeness crabs - one of California's most lucrative marine fisheries.

Given this looming threat, California has taken proactive steps during the last decade to increase our understanding of OA, invest in decision-relevant science, and develop the *State of California Ocean Acidification Action Plan (OA Action Plan) (2018)*. Armed with a 10-year vision and a suite of strategic actions that span the land-sea interface, the state is preparing to adapt and respond to the significant ocean chemistry changes ahead, as well as serve as an international leader to inspire other regions to tackle this shared challenge.

Here, we outline current progress to address OA in California, identify how existing Ocean Protection Council (OPC) investments advance the goals of the *OA Action Plan* and OPC strategic priorities, and share the State's near-term next steps to slow rates of acidification and prepare communities.



CALIFORNIA'S MAJOR ACHIEVEMENTS

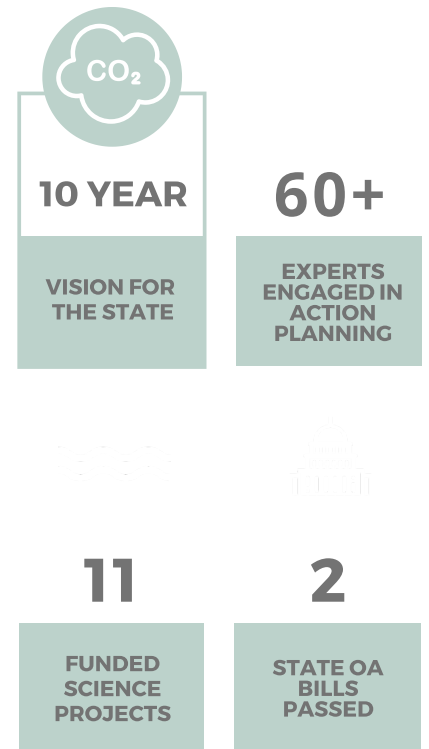
Over the last 10 years, California's major achievements to better understand, mitigate, and adapt to OA include the following milestones:

- **Developed one of the first state OA action plans**, engaging over 60 experts
- **Targeted investments in science** that advance strategies and objectives in the *OA Action Plan*
- **Served as a founding member of the International Alliance to Combat Ocean Acidification**, now including over 90 members, including government, tribal, and affiliate members
- **Developed a west coast-wide OA monitoring inventory**
- **Coordinated action and knowledge exchange across the west coast region** through the Pacific Coast Collaborative
- **Passed two OA bills** in the California State Legislature

NEXT STEPS

While progress has been made, these existing efforts are part of a much larger endeavor, particularly as OA acts in combination with other environmental stressors such as ocean warming and hypoxia. Priorities for the coming years, in alignment with OPC Strategic Plan targets, include continuing to:

- **advance models and the scientific analysis of the relationship between nutrient inputs and OA** impacts to inform water quality management that minimizes biological and chemical impacts.
- **support the development of an OA and hypoxia monitoring and observation system** optimized to deliver decision-relevant information that serves user needs.
- **advance the science on OA and hypoxia vulnerability and identify risks** to California's biological resources, communities, and economies, within the context of other ongoing environmental changes.
- **use our understanding of vulnerability and risk to educate and inform key stakeholders** on OA impacts and adaptive actions.
- **work with domestic and international partners to raise awareness of the threat of OA, and advocate for carbon emissions reductions** – the only long-term solution to avoid accelerating impacts from OA.



THE CALIFORNIA OA ACTION PLAN. In 2018, the Ocean Protection Council adopted the *OA Action Plan* as a roadmap to reduce and prepare for the impacts of OA.



BUILDING ON A HISTORY OF OA ACTION IN CALIFORNIA

California has identified OA as a priority issue for over 10 years. Devastating failure of oyster hatcheries in the Pacific Northwest between 2006 and 2009 led to the establishment of a Blue Ribbon Task Force and a landmark OA action plan for the State of Washington in 2012. Recognizing the need to harness the growing political attention on OA, California in collaboration with Oregon, Washington, and British Columbia, spearheaded the West Coast Ocean Acidification and Hypoxia Science Panel to synthesize the state of knowledge and identify management options.

Following release of the Panel's findings in 2016, the California State Legislature passed two related bills – Assembly Bill 2139 and Senate Bill 1363 – charging OPC to test potential OA mitigation methods and ensure the state continues to receive the best available scientific advice through establishment of a science task force (see below).

OPC has also made several strategic investments in OA-related science that are fundamental to taking effective action. In 2018, as a founding member of the International Alliance to Combat Ocean Acidification, OPC developed the *State of California OA Action Plan* as a roadmap to reduce and prepare for the impacts of OA.



ENGAGING BEYOND STATE BORDERS. State leaders have participated in international climate events to elevate the importance of OA inclusion in policy development and for the consideration of OA in international climate agreements. The Global Climate Action Summit in San Francisco (2018), New York Climate Week (2019), and COP25 in Madrid (2019) are just a few examples of how California is both sharing and learning from the experiences of other jurisdictions and geographies.

CONTINUED ADVISING: THE CALIFORNIA OA AND HYPOXIA SCIENCE TASK FORCE

In 2018, the Science Task Force was convened in response to AB 2139 (Williams, 2016) to serve as an advisory body to OPC to ensure further actions in California continue to be supported by the best available science. The Science Task Force is made up of eight leading scientific experts from California, Oregon, Washington, a non-governmental organization, and the federal government, charged with tracking investments in research and monitoring, connecting new findings with decision-makers, and providing recommendations to guide future action. Throughout their initial term, the Science Task Force played a crucial role in shaping the OA Action Plan, including developing a near-term science strategy to support its implementation.

The Science Task Force is now undertaking an analysis of gaps in the state's OA observing network and developing recommendations to inform investments to build an OA monitoring network to better understand trends and impacts, and to assess the effect of any regulatory and/or management actions.

For more information about the Science Task Force, visit www.westcoastoah.org.

EMERGING OCEAN ACIDIFICATION SCIENCE

California is already making progress on science necessary to support implementation of the *OA Action Plan* through a series of OPC funded initiatives to (a) understand where and when OA effects will most immediately manifest, and (b) identify local solutions for slowing OA's progression and building resilient ecosystems. Below, we highlight progress and insights gained from the state's investments and how efforts align with strategies in the *OA Action Plan*.

MODELING TO INFORM WATER QUALITY MANAGEMENT OPTIONS

Strategy 3: Reduce the pollution that causes OA

Coupled physical-biogeochemical models are helping us understand when and where local nutrient pollution from wastewater treatment plant discharges and agricultural runoff may contribute to coastal acidification and hypoxia in California. Researchers are starting to share initial model outputs which are informing discussions with the California State Water Resources Control Board about potential management options.



ASSESSING IMPACTS TO LIVING MARINE RESOURCES

Strategy 1: Prepare for a full range of OA risk and impacts; Strategy 5: Build resilience of affected communities, industries and interests

Efforts are underway to identify which California species are most threatened by changing chemistry, including crabs, urchins, oysters, and mussels. A recent synthesis highlights impacts to key commercial, recreational, and ecologically important species in California, and research is underway to identify the geography of stress along our coastline. These efforts are critical first steps to support actions of the California Department of Fish and Wildlife, and to advance resilience of coastal industries.



EXPLORING CARBON SERVICES OF AQUATIC HABITATS

Strategy 4: Deploy living systems to slow OA and store carbon

The state has invested in science to understand how to maximize carbon reduction ("blue carbon") through natural and constructed living systems. A recent working group explored the role of submerged aquatic vegetation as an OA management tool. In addition, monitoring efforts in eelgrass beds across the state are helping to inform when, where, and how much these habitats may reduce exposure to OA. Early findings suggest that these habitats can have a small, but measurable effect on local chemistry.



ENHANCING CALIFORNIA'S OA OBSERVING NETWORK

Touches on all OA Action Plan strategies

A comprehensive OA monitoring inventory was completed in 2018, including over 200 relevant field monitoring efforts along the coast from Alaska to Baja California. The Science Task Force is currently undertaking an analysis of California's monitoring gaps to assess how well existing data collection systems address key management decisions in the *OA Action Plan*, and will provide recommendations for expanding key decision-focused monitoring assets in summer 2020.

